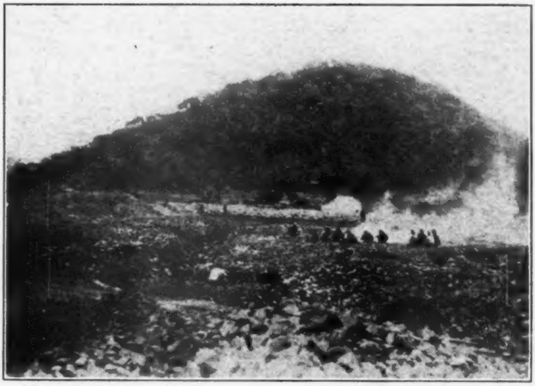
35 cents per copy

ROCKS and MINERALS

Vol. 7. No. 2. JUNE, 1932 Whole No. 24



Courtesy of Ernest M. Skea.

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Featured in This Issue:

A NON-TECHNICAL MAGAZINE

—ON—

MINING - PROSPECTING - GEOLOGY - MINERALOGY

THE BULLETIN BOARD

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Founded by William C. McKinley of Peoria, Illinois

As soon as $5,000 has been contributed ROCKS AND MINERALS *will come out monthly without any increase in subscription rates.*

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ROCKS and MINERALS

A NON-TECHNICAL MAGAZINE

—ON—

MINING—PROSPECTING—GEOLOGY—MINERALOGY

Published Quarterly | **Founded 1926**

Vol. 7 No. 2 | **Whole Number 24**

Contents for June, 1932

Entered as second-class matter September 13, 1926, at the Post Office at Peekskill, N. Y., under the Act of March 3, 1879

Specially written articles (as Contributions) are desired.

Subscription price $1.00 a year; foreign $1.25. Current numbers, 35c a copy; back number, 40c a copy. No responsibility is assumed for subscriptions paid to agents, and it is best to remit directly to the Publisher.

Issued on the 1st day of March, June, September and December. Forms close on the 20th of January, April, July and October.

Authors alone are responsible for statements made and opinions expressed in their respective articles.

ROCKS AND MINERALS   PEEKSKILL, N. Y., U. S. A.

The Official Journal of the Rocks and Minerals Association

We Want Your Vote!

Your friends, relatives, children—see that they vote in the National Rock and Mineral Contest. Every ballot counts.

HOW THE CONTEST STANDS TO DATE

(As of April 20th)

ROCKS		MINERALS	
Granite	12961	Gold	10705
Marble	4412	Quartz	5713
Coal	1489	Garnet	1463
Limestone	861	Hematite	1105
Serpentine	451	Pyrite	544
Gneiss	417	Mica	447
Sandstone	277	Galena	321
Conglomerate	244	Calcite	290
Schist	92	Chalcopyrite	281
Shale	92	Limonite	162
Slate	81	Sphalerite	40
Miscellaneous	75	Miscellaneous	381
Total votes cast	21452	Total votes cast	21452

Interested readers can obtain ballots for distribution among friends. Write to the Contest Editor and state the number wanted.

(To be detached along line)

ROCK and MINERAL VOTE

My Choice

for a National Rock and a National Mineral typical of the United States

The names printed below have been selected by well-known geologists and mineralogists. Make a mark in the square at the left indicating your choice. If, however, the rock and mineral you would choose is not printed on the ballot, write in the names of those you would accord national honors.

ROCKS AND MINERALS Magazine will announce date Contest closes in its September, 1932 issue.

Vote for ONE Rock and ONE Mineral

ROCKS	MINERALS
Granite	Hematite
Gneiss	Gold
Marble	Garnet
Limestone	Quartz
Sandstone	Pyrite
Schist	Calcite
Slate	Limonite
Coal	Mica
Serpentine	Chalcopyrite
Shale	Sphalerite
Conglomerate	Galena

Mail to Editor, National Rock and Mineral Contest,
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Peekskill, N. Y.

Name of Voter..................

City and State..................

(To avoid cutting of magazine, send in your choice on a post card.)

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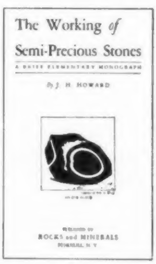

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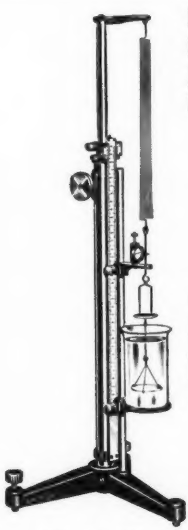

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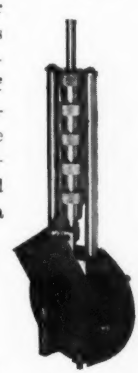

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Manufactured by
EBERBACH & SON, INC.
(Established 1843)
ANN ARBOR, - - MICHIGAN
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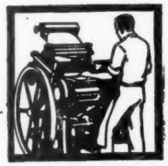
ROCKS and MINERALS

Edited and Published by Peter Zodac

PUBLISHED QUARTERLY



JUNE 1932

The Story of the Dunes

—By—

FREDERICK SHEPHERD

Division of Geology and Mineral Industries, Museum of Science and Industry, Chicago, Ill.

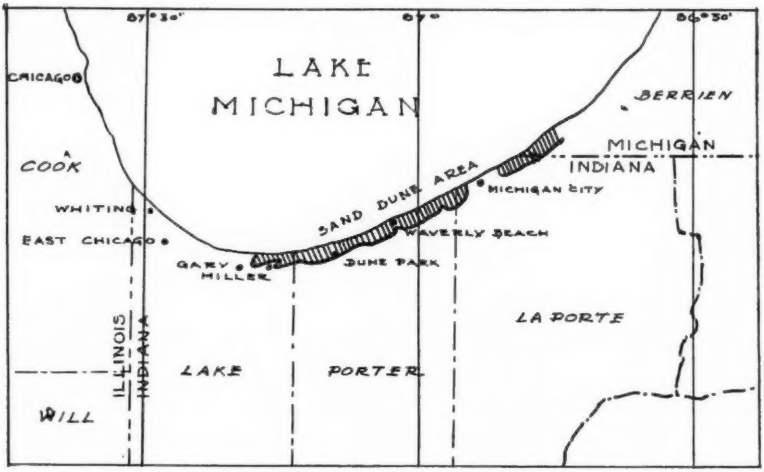
(Photographs and sketch map by the Author)

The age of the sand in Chicago's Duneland is reckoned in hundreds of millions of years, but only about one hundred thousand years of this life have been spent at the head of Lake Michigan. Perhaps another hundred thousand years will see all this sand carried away to the sea.

When you stop to think about it, you find that the sand itself has a story to tell as fascinating as the dunes are beautiful. Take a few minutes and trace with me the steps whereby the grains of sand which were once on the bottom of a great sea, were buried and made into hard rocks hundreds of miles north from where the sand is now, and were shoved many miles south by a sheet of ice over a half-mile thick and then after the climate grew warmer, the rain and rivers moved the sand again and dropped it into Lake Michigan, through which it found its way to the Indiana shores where the winds quickly piled it up into the dunes as you see them today. How did this all happen, and when?

The original rocks in the region north of the Great Lakes were formed in many different ways. Some were laid down in thick beds of gravel, sand, and mud on the bottom of a great inland sea such as the Gulf of Mexico. Still others were fragments blown from the tops of volcanoes, in part even below sea level where they were mixed with the sediments already collecting there. We have many evidences that volcanoes, similar to those witnessed today in Italy, emptied their hot ashes and smoke in the Superior district. Others originated in a molten doughy state and found their way toward the surface of the earth where they cooled and hardened. These latter rocks are the granites which you see used extensively in modern buildings.

All of these rocks, however, were the original rocks, which long before the Ice Age arrived, had been squeezed to an almost unrecognizable mass. The steam shovel, the miner's drill, and the dredge have done their worst to scar the fair face of Dame Nature, but the old lady had her own troubles long before man arrived and began to take liberties with her peaceful, rotund countenance. Her brow is wrinkled, because the rocks forming it have been folded and crumpled by forces within the earth. Pebbles and large crystals within the rock were flattened like pancakes. It is difficult for even the highly trained geologist to wrest from the rocks he now finds, the intricate story of their birth. The tiny particles once making them up are now parts of larger particles or crystals, many of which can be seen with the naked eye.



SKETCH MAP SHOWING LOCATION OF INDIANA SAND DUNES.

SCALE $\frac{1}{735,000}$

400,000,000 Years Ago

The rocks of this vast area have lasted since earliest geologic times, known as the Archeozoic Era. No one will ever know very accurately just how old these formations are, but estimates have been made placing the time when they were formed, in the ways mentioned above, as about 400,000,000 years ago. Since then they have been subject to tremendous physical changes. They have been submerged beneath oceans and latter accumulations of sand and mud have added their weight as the depth increased They have also been raised to great heights above the sea through compression and a bowing up incidental to mountain upheaval. They were easily crumpled and distorted.

Nature Hasn't Changed

Still later, after a very long time had elapsed, and these rocks had been brought above the level of the sea by a far-reaching, uplifting force, they were in part exposed to the air. At once they were subjected to wear by the elements. This weathering process was the same then as it is now. Rain, frost, heat, even plants and animals, all united to produce decay and the ultimate disruption of the rocks into gravel, sand, and mud.

Quartz Survives Best

There are naturally, many differen minerals in these rocks, but of all of these, quartz is not alone one of the most abundant, but it is also the most durable. Quartz is pure silica. It is hard, thus resisting mechanical destruction; and so insoluble that even strong acids hardly damage it. It is natural to expect in the debris, then, that there would be a greater proportion of quartz than of any of the other less resistant minerals, as mica (isinglass) and magnetite (iron oxide) and others have resisted weathering sufficiently so that they are sparingly represented. This mixture is the material of which the sand dunes are composed. Let us now investigate how this debris was moved from its position on the decayed surface of the rocks and accumulated in the form of dunes.

Ice—3,000 Feet Thick

During the Ice Age, a great portion of northern North America was buried beneath a sheet of ice even a half-mile thick. This was nearly coincident with the advent of man into the ladder of

Fig. I.—Wave action on Breakwater at Northwestern University, Evanston, during a March storm over Lake Michigan.

evolution which Professor Schuchert of Yale University has ventured to estimate as occuring anywhere from 60,000 to 150,000 years ago, but a few days to a geologist. The ice advanced and retreated over the dune area at least three distinct times, we are told, and each of these visits was recorded on the present face of the earth. The last of these advances, distinguished as the Late Wisconsin, was the most important. The ice front advanced in characteristic tonguelike masses or lobes, one of which proceeded down the basin of Lake Michigan scouring out its deep channel in the pro.-cess. As the ice advanced it gathered up all the loose material, rich in quartz, as already mentioned, that covered the ancient rocks, and carried the material down the Lake Michigan basin, which of course was not filled with water until the final retreat of the ice.

When the ice melted back, the sand, gravel, and even enormous boulders, were deposited wherever they may have been at the point farthest advanced. Much of this has been redistrubuted by rain, by rivers flowing into the lake itself, but many thick deposits remain today much as they were at the close of the Ice Age. Bordering Lake Michigan in northestern Illinois and southeastern Wisconsin, these glacial deposits are prominent, even up to a hundred feet or more thick. These deposits serve as the immediate source of the sand and from which the dunes are built.

From Ice to Water

The waves of Lake Michigan are not alone beautiful, but destructive, as well. Great precautions are necessary to protect the highways and shore properties from them as their force is tremendous. But it is not only the force but the direction of the waves that play such an important part in making possible the formation of dunes. If a wave approaches the beach at right angles, it will work the sand over, loosen it up, and carry some of it lakeward, destroying the beach or bluff, and extending the broad terrace in the lake near the shore.

In the region we are intrested in, however, the average attack of the waves is oblique. The winds sweep down the lake from the north, but where they strike its southwestern shore, the beach lies northwest-southeast, thus the waves strike neither parallel nor perpendicular. After reaching the shore, the waves move on in a broad sweep southward enabling the back wash to remove the sand and carry it out into the lake where it is soon picked up by the off-shore current and transported to the beaches in the vicinity of the dunes.

Fig. II.—Pier and Beach (Lake Michigan) at Highwood, Illinois.

Lake Currents Charted in 1895

As far back as 1895, Mr. Harrington of the Weather Bureau made an extensive survey of the currents of the Great Lakes by setting afloat hundreds of bottled papers. On their recovery, he plotted the directions of the currents thus shown to exist. He proved that there is a southern drift on the west side of the lake which continues to the Indiana shore and then swings northward on the east side for a considerable distance.

Fig. III.—Wind Ripples on Sand Dune near Gary, Indiana.

But, if you are unwilling to accept the evidence of a chart, look at the pilings built out from the shore along the Outer Drive. As the rate of shore erosion became sufficient to endanger property and create enormous losses yearly, breakwaters, or rows of pilings jutting out from the shore, were built to protect the land from this wave attack. The average rate at which the shore is destroyed in places south of Waukegan is said to be over five feet a year. A breakwater, a few years old, will show this clearly. On the northern side, the beach will have piled up several feet higher than on the south, also increasing the width, as can be seen in many localities north of Chicago.

The Sand Accumulates

Once the sand has been brought to the head of the lake by these currents, it is able to accumulate only on very gently sloping beaches. After this accumulation is started, the sun and wind unite to dry it out. When the waves are sweeping over the lower portions of this beach, however, the sand is kept too moist to be moved by the wind, but between storms or high winds, the waves

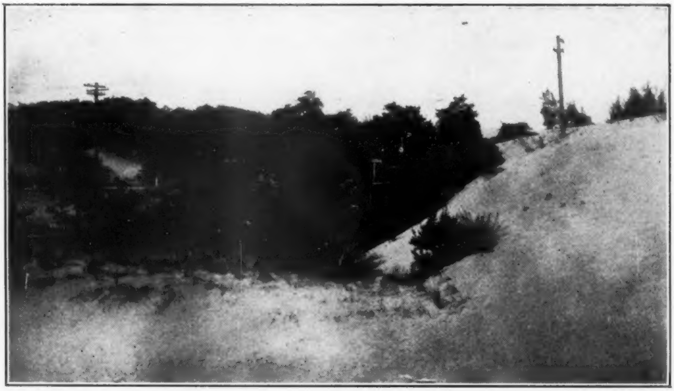


Fig. IV.—An Encroaching Dune opposite Vaughn's Tavern, Dunelands, Indiana.

quiet down, leaving this wet portion at the mercy of the sun and wind and as soon as it is dried the work of the wind begins—the most influential agent in connection with sand formations.

The Wind Forms Ripples and Dunes

The first effect of wind-work is seen in the migration of a sand particle. Usually ripple marks will be formed and they are very common features of both the beach and the dune. The conditions for the formation of wind-ripple marks consist of two factors: the velocity of the wind and the variety of the sand grains, of these the latter is the more important. If the wind is so weak that it will fail to move the finer particles of sand, it will pass over the beach without forming any ripples. Also, should the wind be strong enough to move all the particles of sand, there would be a sand storm and no ripples could form then, either. Haven't you felt the blast of the sand blowing from the dunes when there was a fairly strong wind? When the sand blows off the top of the dune in this manner it is appropriately called "dune smoke". Cornish, a famous British authority on sand formation has said that "The rippling takes place when the eddy in the lee of the larger grains is of sufficient strength to lift the smaller." Thus, if the sand is even in size no ripples can form, because according to this, the ripples are the direct result of the sorting action of the wind. In reality, ripple marks are but miniature sand dunes, both in shape and origin.

"Singing Sands"

There is a small strip of sand parallel to the water's edge which is known as the belt of "Singing Sands". When you scuff your feet through this part of the beach or drag a stick on it, it strikes up a peculiar ringing note that can be distinctly heard at a distance of more than twenty-five feet. Geologists differ in their explanations of these "Singing Sands". Some say they are due to friction, some to a salt deposited around individual grains of sand, but the majority seem to think that the phenomenon is due to a certain moisture condition somewhere between thorough soaking and a slight moisture.

Formation of the Dunes

Sand dunes are commonly formed in two ways: first, by the overtaking of one ripple by another, and second, by the deposition of sand in the lee of some obstacle. Many writers describing the dunes have mentioned the latter, but few seem to give due consideration to those dunes formed from complex ripples. Both types are found in the Indiana Dune area and are important.

Sand particles also move in two ways: by rolling and jumping. The former is usually done by a steady wind while the latter is brought about by gusts of wind which are probably the more frequent

here. We have previously noted that ripples are formed by the wind blowing at a given rate. When formed, they advance directly in proportion to the strength and velocity of the wind, but the larger the ripple, the slower they are able to migrate. Thus you can see that a small ripple will be able to overtake a larger one in the same wind and as it does so, it forms a still larger one, which will in turn move more slowly and be in the way of another smaller, more rapidly-moving ripple that will unite with it. Thus, we have a small dune already formed and alive.

The dunes just described are one type of embryonic dunes, which form a primary belt between the beach and the main dune area. The major dunes, known as the main dune complex, are well-named. The dunes in this area differ widely from each other, for they are composed of several dunes, which have encroached on each other and the original form and indentity of the individual have been lost.

The lee-tpye of dune formation is more easily understood, for almost anywhere in the region these young dunes may be seen forming. A tuft of grass, a boulder, broken box, or a tree stump, or any object that is embedded in the way of the wind will be sufficient to cause it to drop part of its load on the protected side, which will in turn increase the size of the obstacle and a new dune will have started.

"Sand versus Plants"

Once a dune is started, the most fundamental factor in its growth is the presence of ground moisture, which allows the growth of vegetation. The botanist is well repaid by a visit to the dunes, for there he finds one of the most intensely interesting dramas found anywhere in nature. There is a constant struggle for life on the part of the dune and the part of the few plants and trees that can survive the arid conditions There is no finer place to watch the law of the "Survival of the Fittest" in operation than in the dune region where first the dune is the "fittest" and then vegetation.

The dune complex is a series of dunes interspersed with deep gullies which are frequently flat and oval-shaped. These are pannes. In these low areas, which are generally moist, multitudes of seeds accumulate each season. They are blown in from adjacent areas and easily take root in the moist sand. The willows, dune grasses, sand cherries, and even a few scrub oaks or jack pines are able to grow under these conditions and when once started they are an obstacle to the wind and the fight starts. As the wind drives in more sand it is checked by the grasses or young bushes, and burial commences. This may result in the total de-

Fig. V.—Stratification in Sand Dune exposed by a Road-Cut. Indiana State Dune Park.

Fig. VI.—Marum Grass is one of the Firmest of all Sand Binding Grasses. Photographed near Miller in the Indiana Dunes.

struction of the plant, or if the vegetation has a sufficient foothold it may bury the dune and thus make a dead dune.

It is also possible for a dead dune to come to life after it has been captured by vegetation. A tree may blow over, or a plant be destroyed by fire, or in any one of the dozen ways the sand may become exposed to the attack of the wind. This produces a "blowout" and the dune will be torn apart by the wind and the sand carried in to a new location and be

Fig. VII.—Carrot-shaped Trunk of a Cottonwood Tree in the Indiana Dune Park.

Fig. VIII.—Cross-bedded Sand Dune.

available for the growth of a new dune. "Blowouts", such as these, are commonly seen in the rejuvenated dunes of Indiana.

One of the most striking features in the vegetable kingdom of the dune area is found in a variety of the cottonwood trees. The buds of this tree have the ability to convert themselves into leaves, stems or rootlets, depending upon whether or not they are exposed to the air. Where the wind has removed the sand around one of these trees, the exposed trunk will be found to be carrot-shaped, and where there were once roots, there will now be branches. Many of these are found in the Indiana Dunes.

The Dunes and Chicago

The Indiana dunes are a great asset, not only to the people who like to spend their holidays there, but also to the great industries of the Chicago area. Even today, the sand from these dunes is being sucked by giant pumps—forty miles—to extend the Outer Drive and build new land on Chicago's great waterfront. The poorly drained, low lying bed of an ancient lake is now one of the leading industrial centers of the world. The accessibility of raw materials, unexcelled transportation facilities to carry finished products to the world-wide markets, and many other vital economic factors have created an ideal industrial situation, fostering the great steel, cement and oil interests, from this, once a waste land.

Fig. IX.—An Embryonic Sand Dune in the Foredune Ridge adjacent to the Beach. Near Gary, Indiana.

Modern Petrology

—By—

THOMAS W. FLUHR, A. M.

There are two methods of studying rocks. One is the common method of taking hand specimens and of examining them with either the eye or with the aid of a magnifying glass. In the field this is of course the only method that can be used, and it undoubtedly has great value. In the laboratory one can make thin sections of the rock and call on the petrographic microscope for assistance. Where this method can be used, its value far transcends that of megascopic observation.

In ths method, a small piece of rock is first ground smooth and polished on one side. It is then cemented to a thin glass slide. The rock is then ground down until only a thin layer of rock, about one one-thousandth of an inch in thickness remains attached to the glass slide. A cover glass is cemented over the tissue-thin piece of rock and it is ready for use.

On examining it with a petrographic microscope it is possible to determine readily just what minerals make up the rock. It is also possible to determine the grain size, the relations of the grains with one another, and to estimate with a fair degree of accuracy the proportion of each mineral constituent present.

The method has been used extensively, and some investigators such as Rosenbusch, Zirkel, Lacroix, and Iddings, have classified and arranged the rocks according to their mineral makeup and the disposition of the grains. For many years this work has gone on and hundreds of types of rocks have been described in minute detail and classified.

Of late years, Professors Berkey and Colony, at Columbia University, have led the trend of petrographic work in another direction. Rocks are infinitely variable, and an infinite number of types and classes can be made out, and each described in minute detail. Much more important and much more difficult is the attempt to make out the history of a rock, and to determine what has happened to it. For no rock is a simple entity, but each has had a life history, more or less complicated. The unraveling of this life history, as far as it may be determined, is the aim of modern petrology.

In mining work, for example, it is of certain use to be able to distinguish between a quartzite and a sheared granite. It is, however, of much more importance to be able to tell whether or not a valuable mineral deposit in the quartzite was deposited originally with the quartz when it was laid down as a sediment., or whether it was introduced by the action of neighboring igneous bodies. Such information would aid greatly in determining the extent and variability of the mineral values.

In the case of a granite, used as a building stone, it is of importance to know whether an alteration of material in the rock, affecting the durability, is an effect due to superficial weathering, or whether it has been caused by the action of mineralizers within the rock itself, and may be expected to continue to depth.

To be able to determine the original character of a rock, the processes of static and dynamic metamorphism which have affected its original structure, the possible introduction of material from outside sources, and the replacements and alterations which have taken place in the rock, is of far more value than to be able merely to describe and classify a rock. A knowledge of the mineral makeup of rocks and their classification is of scientific importance; a knowledge of the history of a rock and of the changes which have taken place within it, is of intense practical importance, and can be used directly in the solving of numerous problems.

Determinative Mineralogy for The Collector

— By —

JOSEPH F. BURKE

Public Museum, Staten Island, N. Y.

The collector in acquiring his specimens, whether by visits to mineral localities, exchange, purchase or other means, gradually adds to his knowledge of the appearance and physical character of a number of minerals. This knowledge becomes more and more extensive, but his ability to identify his minerals is usually confined to the recognition of the simpler physical properties.

While somewhere in the neighborhood of a thousand mineral species are listed the collector will never see, let alone possess, many of them. Some species are extremely rare and are missing even in large museum collections. The number of species the collector will acquire will be more or less limited, depending upon the breadth of his collecting. The textbooks, of different authors, list varying numbers of minerals classified as common; somewhere in the neighborhood of two hundred would probably be a representative number. As such lists ordinarily include the species coming into the possession of the average collector, his problems of determination are simplified to that extent. His ability in identification, gained in handling and arranging his specimens, will enable him to proceed with the use of some more systematic method in the determination of minerals new to him.

1. Physical Determinations

Physical determinations are simple and can be of great assistance to the collector. The equipment necessary is limited and easily obtained. The method requires the practical application of his observational powers, which latter have already been applied though not systematically. There are a number of excellent physical tables[1] available, the use of which will develop systematic observation.

By way of equipment for making physical determinations, the collector should have a streak plate, a pocket knife, a hand lens, a magnet, and if possible, a scale of hardness. The streak plate is made of unglazed porcelain, or a fine white whetstone may be used. The hand lens should be one of medium power from about 5 to 10 diameters. An ordinary horseshoe or bar magnet is sufficient. The scale of hardness of nine minerals (without a diamond) can readily be assembled or purchased.

In some tables the determination begins by deciding whether the mineral has a metallic or non-metallic luster; in other tables the initial observation is the color of the streak when the mineral is drawn across the streak plate. In either event, the identification of the mineral is gradually narrowed down as observations are made on the luster, streak, color and hardness of the mineral. This usually confines it to a small number of minerals of which a more detailed description, given in the tables, enables the collector to complete his determination.

As the collector develops ability in making determinations and makes use of the other methods described further on in addition to the physical determinations, his results become surer and the work much simplified.

II. Chemical Determinations—Blowpipe

In the blowpipe, the collector will find a very simple and valuable tool for certain determinations. To use it to the exclusion of the other methods here described would present many difficulties and require a high order of ability and experience. Using it in its simpler applications, the collector will find many a short cut to the answer he is seeking.

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1. Crosby, *Tables for the Determination of Common Minerals.*

Eakle, *Mineral Tables for the Determination of Minerals by Their Physical Properties.* Wiley.

Kraus & Hunt, *Mineralogy*, 2nd Ed. McGraw-Hill.

Kraus & Hunt, *Tables for the Determination of Minerals*, 2nd Ed. McGraw-Hill.
Lewis-Hawkins. *A Manual of Determinative Mineralogy*, 4th Ed. Wiley.

For occasional use, a simple brass blowpipe is all that is needed and with it a paraffin candle and a charcoal support (usually 4x1x¾ inches) are sufficient for some tests. By the addition of a few dry reagents (borax, sodium carbonate and salt of phosphorus) the application of the tests can be extended. In addition, a piece of fine platinum wire (B. & S. 26) with the borax and salt of phosphorus makes possible an additional number of valuable tests. For these, it is necessary to powder the minerals for which a small hammer and a steel anvil (small block of steel about 1½x1½x½ inches) are required.

In order to learn how to use the blowpipe—which may seem difficult the first time it is tried, but becomes simpler after five or six trials—the collector should refer to one of the textbooks[2] that deal with this subject. Some of the older books are quite exhaustive. In the newer books the tendency has been to include a chapter or a section on the blowpipe, in a textbook on determinative mineralogy or on general mineralogy. A small book that confines itself to the blowpipe and calls for a simple list of apparatus is that by Butler.

III. Chemical Determinations—Wet Methods

The blowpipe method of determination is sometimes referred to as the dry method and contrasted with its use is the wet method of chemical determination of minerals by use of simple laboratory equipment and suitable reagents. This method may not appeal to some collectors because of the necessity of using acids; nevertheless the determination of certain minerals can more easily be accomplished by this means.

It is desirable to limit the number of reagents and the equipment. In this connection assistance can be had by reference to the handbooks[3] issued for prospectors, as a prospector must economize on weight and bulk and the tests suggested for his use are simple and require a minimum of equipment.

If the collector is fortunate in having some training in chemistry and possesses a suitable microscope, he can extend his determinations into the field of chemical microscopy. It is possible by this means to carry out determinations of very small amounts of material. Sometimes the collector desires to identify associated minerals present in a specimen, occurring perhaps in the form of microscopic crystals. By use of the microscope, reactions can be carried on with but a single crystal and observations made that permit a determination. The equipment required is more extensive and costly than any yet referred to. The textbooks[4] listed show what is required and how determinations by this method are carried out.

IV. Miscellaneous Methods

A number of additional methods are available to the collector, but instead of being adjuncts to his mineral collecting, they are apt to consume much of his time in the study of techniques. It does no harm to know of them, so they are mentioned.

By use of a polarizing microscope, determinations can be made of the mineral constituents of rocks[5]. Considerable skill is necessary in the grinding of the rock sections which must be extremely thin. The polarizing microscope is also used in the determination of crushed mineral grains; the mineral is finely crushed mounted and observed. Such methods require a great deal of experience.

Another method requiring expensive equipment and considerable experience is

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2. Brush-Penfield, *Manual of Determinative Mineralogy*, 16th Ed. Wiley.
Butler, *Pocket Handbook of Blowpipe Analysis*. Wiley.
Ford, *Dana's Manual of Mineralogy*. Wiley.
Kraus & Hunt, *Mineralogy*, 2nd. Ed. McGraw-Hill.
Lewis-Hawkins, *A Manual of Determinative Mineralogy*, 4th Ed. Wiley.
Moses & Parsons, *Elements of Mineralogy, Crystallography and Blowpipe Analysis*, 5th Ed. Van Nostrand.
Rogers, *Introduction to the Study of Minerals and Rocks*, 2nd Ed. McGraw-Hill.
Warren, *A Manual of Determinative Mineralogy*, 2nd Ed. McGraw-Hill.

3. Anderson, *Prospector's Handbook*, 12th Ed. Van Nostrand (Agent).
von Bernewitz, *Handbook for Prospectors*, 2nd Ed. McGraw-Hill.

4. Chamot, *Elementary Chemical Microscopy*. Wiley.
Chamot and Mason, *Handbook of Chemical Microscopy*, Vol. II. Wiley.
Putnam, Roberts & Selchow, *Contributions to Determinative Mineralogy, Microchemical Tests*. American Journal of Science. Vol. 15, 1928.
Short *Microscopic Determination of the Ore Minerals*. Geological Survey Bulletin, No. 825. 1931.

5. Johannsen, *Manual of Petrographic Methods*. McGraw-Hill.
Luquer, *Minerals in Rock Sections*, 4th Ed. Van Nostrand.

the determination of opaque minerals in polished specimens. A mineral is ground flat on one surface, is polished, and observed under the microscope using a vertical illuminator. A refinement of this method has more recently been introduced, using polarized light. The books[6] listed are the most recent covering this subject.

In passing, mention might be made of crystallography, ultra-violet light, and the use of the microspectroscope for mineral determinations.

SUMMARY

The collector being interested primarily in his collection, can, without becoming deeply involved in technique, add to his knowledge and to the proper classification of his mineral specimens by making use of the simpler methods of determination referred to above. The physical method is simply an extension and more systematic use of the observational powers already applied in collecting and arranging his specimens. It requires little in the way of apparatus. The possession of and ability to use a blowpipe facilitates the determination of many minerals. Sometimes it may be used alone and sometimes in conjunction with the other methods described. Certain of the simpler tests by the wet method can advantageously be used where this method is convenient for the collector.

The other methods have been of great value to mineralogists and have been of great assistance in increasing our knowledge of minerals. The expert may make use of one or more of them, but the average collector will find the simpler methods ample for his purpose.

6. Farnham, *Determination of the Opaque Minerals*, 1931. McGraw-Hill.
Short, *Microscopic Determination of the Ore Minerals*. Geological Survey Bulletin, No. 825, 1931.

The Sluice Box

—— *By* ——

A. RIFFLE

"Old Bill" is dead. A character who could have supplied a Bret Harte with material for a couple of volumes received a couple of inches of passing notice in the Helena, Montana, papers. But those of us who knew him mourn the passing of not only a real friend but also one of the last of the old time Montana prospectors. However, aside from the peculiarities and idiosyncrasies of his type and of which he possessed a full measure, none of us who knew him will ever meet again his equal in courage, honesty, devotion to principles and loyalty to his friends. "Old Bill" was grey with the many years; his immediate surroundings were simple but his personality was as colorful as the solar spectrum and the Village will never seem the same again.

For the benefit of the newer subscribers, I will state that "Old Bill" has been a part of **The Sluice Box** from almost the first issue of ROCKS AND MINERALS and that I have a few more anecdotes about him for coming issues.

Steam shovels are now working in gravel banks and air drills buzzing on the rock cliffs to make new or better roads. Some of these places should prove good hunting grounds for crystallized minerals and other interesting specimens.

Mineral collecting has survived the depression in better shape than many other activities. Why? Simply because we have a real magazine on the job that never let down in any respect during these nearly three years of hard times; in fact it was enlarged and improved. The new offerings of the dealers, the interesting articles and the regular and high class appearance of this magazine is the one factor that has brought mineral collecting through without a serious setback and held the value of your collection at a practically undisturbed level. Surely it is up to you to keep your own subscription and solicit one or two others.

Marine Fossils in Imperial County, Calif.

—*By*—

ERNEST W. CHAPMAN
1814 *Pepper St., Alhambra, California.*

Many readers of ROCKS AND MINERALS are no doubt interested in fossils. Having recently made a very interesting trip to some fossil deposits in California, the writer will attempt to describe some of the things to be found there. These fossil beds are in the Carrizo Creek region of the Coyote Mountains in Imperial County.

Several deep canyons have been eroded into the sides of the mountains, and in one of these—Alverson Canyon—(known locally as Shell Canyon), the most extensive fossil deposits are found. The most impressive thing to be found here is a coral reef, several hundred feet above sea level and extending over the mountain range for a distance of approximately fifteen miles. After extensive study of this coral-fauna, geologists have decided that it is not the same species found in the Pacific Ocean, but is related to the Atlantic Ocean coral which is found near Florida and the Bermudas.

Geologists have shown that six coral genera appear here in fossil form. The theory is that during Eocene and Oligocene time there was a connection between the Pacific and Atlantic Oceans across what is now Central America. In upper Oligocene time this connection was terminated by the forming of a land area extending from North to South America. The coral is believed to have been killed by being buried beneath sediment. In some places it is found buried in Pliocene sandstone, while in other places it lies exposed upon the effusive rock, a dark-red lava.

The lower part of the canyon walls is a soft yellow shale showing excellent laminations. Then there is an area of about eight feet in height containing great quantities of fossil clams and other mullusks as well as oyster shells. Above this is a formation of arenaceous sandstone from which perfect coral heads may be cut.

On the slopes of the mountain just above the top of the canyon wall, large quantities of fossil clams and oyster shells have been weathered out of the rock. These are somewhat weather-beaten, but with a pick any number of perfect fossils may be dug from the underlying sandstone. It is believed that at the time these creatures lived, some one hundred million years ago, this region was covered by a clear warm sea.

It was of interest to note the different sizes of the fossil clams and how they are distributed. The largest found measured six and one-half inches in circumference and the smallest two and one-half inches. In some places only large ones were to be found, and in others only small ones. Then in other places the large and small ones were together. When the clams are broken, the "meat" separates from the outer part. Some of the oyster shells found are twenty inches in circumference around the outer edge.

This deposit has scarcely been touched and as this region is slowly sinking it is not improbable that in some far distant time these fossil mullusks and coral will again take their place in the sea.

Kennth L. Renoll, of Hanover. Penn., one of our warm friends and subscribers and who has the distinction of sending in the second largest number of votes for our Mineral Contest, is a high school student in his city. He secured a large number of votes from his fellow students and friends and in addition has had an item calling attention to the Contest and requesting votes in his local newspaper, **Hanover Evening Sun.**

Ben Bagrowski, 1722 S. 22nd St., Milwaukee, Wisc., is interested in organizing a mineral club in his city. Those of our readers residing in or near Milwaukee, and who may share a similar interest, are urged to get in touch with Mr. Bagrowski and give him their full support.

Our sincere good wishes are extended Mr. Bagrowski that his plans for the club may meet with great success.

A Trip to Barringer Hill

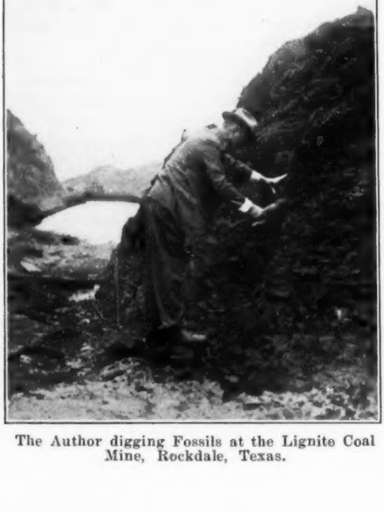
— By —

C. L. BROCK

Director Houston Museum of Natural History, Houston, Texas.

Knowing that the famous rare earth minerals mined at Barringer Hill in Llano County, Texas, will be entirely covered with water within the next two years, the Houston Museum and Scientific Society decided that there should be another expedition to secure as many of the rare earth minerals as could be obtained. On April 18th, 1931, it was decided that George L. Fisher, eminent botanist with an exchange collection of more than 25,000 different specimens of plants, E. C Brock, chemist, President of the Standard Chemical Company of Houston, and the author should compose the party to be sent to Barringer Hill. We had in the meantime obtained a permit to prospect at the mine from the Westinghouse Company, the owners.

We started out at 6:00 A. M., on the 19th of April, driving through Brenham to Milano where we expected to find lignite beds. We were advised that the locality was near Rockdale, further on, which we easily reached and found that the deposit was being worked as an open pit mine by the Sandow Coal Company. We secured some very fine specimens of the lignite (also called brown coal). Next we went towards West Texas going thru Taylor and Georgetown and just beyond Georgetown we ran into the most beautiful sight of flowers that I had ever hoped to see. For a distance of fifteen miles on both sides of the road, Blue-Bonnets, the State flower of Texas, extended in every direction as far as the eye could see of such an intense blue that even the trees appeared blue. We passed dozens of artists painting at their easles busily engaged in transferring these wonderful sights to canvas.



The Author digging Fossils at the Lignite Coal Mine, Rockdale, Texas.

Our next stop was San Saba, where we stayed the first night and secured from some of the residents wonderful specimens of calcite in large masses and quartz crystals on limestone. The next morning we headed for Richland Springs where we went thru the Caverns of that name and collected a few specimens, then back to San Saba and over to Llano where we stayed the second night.

From Llano we went east on the Burnett road a distance of five miles to an abandoned gold mine where we collected some of the green rock from which the gold was extracted. This mine produced in one year $30,000 worth of gold and a considerable quantity of platinum, but the operation of milling was so expensive that the mine was abandoned. From here we went further east to Bluffton and on down the Colorado river to Barringer Hill.

At Barringer Hill, we found very fine specimens of gadolinite, cyrtolite on quartz in a very peculiar formation and also secured a large quantity of allanite from a man living at the mine. The greatest find of all, however, was two crystals of nivenite which we are guarding as if they were diamonds, because we

The Lignite Coal Mines at Rockdale, Texas, operated by Sandow Coal Co. Black on each side is the Lignite (also known as Brown Coal.)

realize that probably no more of this very rare mineral may ever be found here.

After loading the car up with about 350 pounds of specimens, we went back to Bluffton, crossed the Colorado river and took a road up into the mountains searching for a lead mine of which we

View showing entrance to the Rare Earth Minerals Mine at Barringer Hill. Eleven different Rare Earth Minerals have been found here.

The Main Ore Body at Barringer Hill consists of Huge Blocks and Masses of Quartz and Feldspar and projects boldly above the surrounding Granite, resembling a mound in appearance, as is illustrated in the view here given. The outcrop is, or was when discovered, approximately 100x500 feet in area.

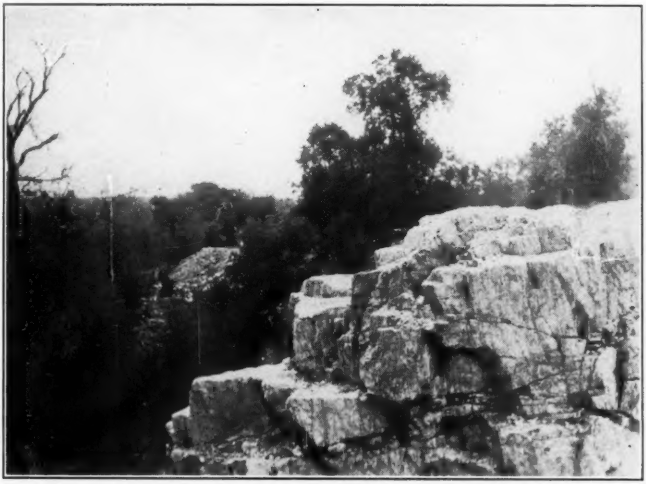
had heard. After traveling about eight miles of mountain road which was in a very poor condition so that the Dodge had some difficulty in covering the ground, we came at last upon the mine buildings and the mine itself. A gentle-

View showing how abruptly the Ore Body (Quartz) projects above the immediate surroundings.

A Close-up View of the Quartz Formation with Feldspar (orthoclose) on left. A crystal of Quartz, 703 pounds in weight, was found at this Mine.

man, whose name we later found to be Clyde Maxwell, came out of a small house nearby with a lantern and asked if he could help us. Explaining our mission we were cordially received and all assistance possible was rendered us in making our short visit a pleasant one. We entered the mine and collected some fine

Another View of the Quartz Ore Body at Barringer Hill.



View showing Waste Dump in background and Main Ore Body (Quartz) in foreground, at Barringer Hill.

specimens of the lead ore (galena) which was chiefly of the disseminated variety. Mr. Maxwell also presented us with a sack full of concentrates taken from a large number piled up awaiting an increase in the price of lead.

Leaving Mr. Maxwell and the lead mine, we went back the eight miles to the

The Waste Dump at Barringer Hill. The refuse is mostly Quartz.

George L. Fisher, an eminent Botanist on the Ore Shoot or Chimney at Barringer Hill.

main highway, thence east three or four miles, where we turned south. After traveling about three miles over a fairly good road, we came to a graphite mine owned by the Ceylon Graphite Company where we collected about 100 pounds of graphite specimens, mostly flake graphite in granite. From here we went on to Burnett and then to Marble Falls where we spent the night. From the latter place we went to Johnson City and to Austin where we called on Professor Wm. Niven, now past eighty years of age and the discoverer of the famous Barringer Hill.

Professor Niven now resides in Austin. He is a trustee of the Houston Museum and Scientific Society and very much interested in the Houston Museum of Natural History. We presented him with a large chunk of a Barringer Hill mineral and he in turn presented us with one of his Mexican Carved Tablets, also a fine polished specimen, 6x9 inches in size, of rose garnet from his Rose Garnet Mine, located in the State of Morelos in Mexico.

Reluctantly we left Professor Niven. headed for Huston and arrived home before dark on the same day.

The largest number of votes received to date from a subscriber for our Mineral Contest total 312 and were sent us by Father F. E. Bogner, of Hoboken, N. J.; the second largest number is 204 sent in by Kenneth L. Renoll, of Hanover, Penn.; and the third largest is 175 sent in by Ben Bagrowski, of Milwaukee, Wisc.

AN APOLOGY

George H. Marcher, Secretary of the Gemological Society of America, Los Angeles, Calif., sent us 16 subscriptions during the past year for which he was given no credit in our last two issues.

We sincerely regret this omission and duly apologize for this apparent lack of appreciation.—The Editor.

Koleta's Kurio Kabin

—*By*—

WILLIAM C. McKINLEY

Arkansas is not only to be known as the home state of the American Diamond, but will soon be thought of as the "resting place" of "Koleta's Kurio Kabin"—the hill-people's curiosity museum, which is filled with all things interesting, ranging from rare Persian snuff-boxes and beautiful cut-gems, to large molluscs and period furniture dating back to the Revolutionary era. All of these "treasures" have been collected from every nook-and-corner of this old earth, through the help of other collectors and friends, besides personally, by their owner, who is Miss Koleta E. Walker, of Newark, Arkansas.

Miss Walker is a most interesting, demure, yet quite frank, young lady of 19 years, and the daughter of one of Arkansas' well-established families, whose ancestral background may well explain why Miss Walker is taking up such work as she is, for, with a personality fairly teeming over with Southern loveliness, she now typifies that beloved portion of our country—the Sunny South.

Interviewed in her Kabin, the interior of which is a perfect paradise of beautiful, and odd, curiosities, in the quiet of Newark town, Koleta told me the fascinating story of how she came to begin this unique work, as well as many interesting episodes which have happened during her collecting.

"I collect them because I love 'em," was her only answer given to "why" she collects these curios, and such. And isn't love enough to do almost anything?

"To me," she said, "these treasures have an unlimited amount of sentiment, goodwill, friendship, beauty, and understanding attached to them! In brief, they mean everything to me. In the summer of 1926 I really began collecting in earnest, by hunting for mineral specimens, fossils, rocks and other natural history specimens in my own vicinity. In reality, I had touched some dormant and undeveloped spot of my being, that responded so surely, so sincerely and enthusiastically, that I was astonished! This was what I liked! Soon text-books were taken up and studied and I found that I was just as interested in one nature study as another. It was through the much appreciated help of Mr. Chas. Colburn of Vermont, and my pupils of the hill-districts, that I was able to reap harvest after harvest of specimens for my collection which was growing rapidly. It was not long until I became acquainted with other collectors and exchanges soon began piling up on me daily. I was surely advancing!

"My ambition was being fired to higher plains! I wanted to collect more! This was really getting under my flesh; I had a bad case of "collector's fever". Curios were my next hope. I then conceived the idea of starting at home on that subject and what a gold-mine of material I did find! Everything from Revolutionary War razors, Civil War surgical instruments, old jewelry belonging to my past antecedents, furniture used by my great-grandmother, cut-gems, and jugs—to guns, kettles, dishware, and others. From my friends came pouring in century-old spinning wheels, Thomas Jefferson spoons from his direct descendants, bullet-molds, old blown-glassware, Indian relics from Westerners, rare sea shells worth over $800 a specimen from foreign seas, and innumerable other things—all an endless array of antiques, curios, mementoes, and such. It was at this time that I conceived the idea of building my cabin, since my collections would soon need a good housing for them, and our home was not large enough to hold it all.

"The Kabin, in its making, was surely built by "helping hands and willing hearts." The logs were hewn from the forests on our own land, here; the concrete floor is from an abandoned mining mill, some miles away; my uncle gave me the shingles for the roof; and, a

Koleta E. Walker, wearing her Indian Vest (made by a member of the Blackfeet tribe), at the door of her "Kurio Kabin".

friend, the windows. My door came from an old mining prospector; and the most important factor—its construction, was all completed by friends, and neighbors around and in this vicinity, besides the financial end by my most helpful parents. So there you are—the little brown Kabin in Arkansas is now a reality, of which I am duly proud. It was surely built on "ties of friendship".

"Another important fact is, that all my specimens have not cost me a cent—only for postage on packages I had to send away as exchange material to other collectors. This has all been made possible by the kindness of my many friends, which range from cowboys to college professors. "Tex" Moore, Montana's famous cowboy artist, has been so interested in my Kabin that he has given me his rare collection of guns and Indian relics. Mrs. Bernie Babcock, famous and foremost writer of this State, has been most helpful in identifying shells gathered from the White and Black Rivers, here in Arkansas; also, in encouraging my collecting of natural history subjects.

"With the future to look forward to; with the many friends I have; and with a Kabin to work in and for, I am perfectly happy, contented, and immensely proud of everything. I hope someday to supplement it with a museum; then, instead of having a "little Kabin", I hope to own a 'big Kabin'."

Just think! Only a girl of 19, with such enthusiasm and ambition as this! Is there any limit to what heights she may not reach?

Due to the interest aroused by a number of cases of thallium poisoning recently reported in the press, Field Museum has placed a specimen of thallium on exhibition in its collection of rare elements. Thallium is a rare element so poisonous that it is extensively employed, especially in the West, to exterminate vermin, according to Henry W. Nichols Associate Curator of Geology.

Field Museum Notes and News Items

Contributed by

THE FIELD MUSEUM OF NATURAL HISTORY

Chicago, Ill.

Field Museum is in possession of two bricks of silver which are historically as well as intrinsically valuable. One of these was made in 1878 by the first water-jacket furnace at Leadville, Colorado, and the other was made from ore brought from some of the first silver mines operated in Montana. The specimens were presented to the museum by William J. Chalmers, of Chicago, and have been added to the economic geology collection.

The way in which aluminum ore forms is illustrated by a specimen, known to have had its entire development in less than 100 years, now on exhibition among the mineral collections at Field Museum. The specimen was collected at Joachim Alvarez near Nova Lima in Minas Geraes, Brazil, by the Marshall Field Brazilian Expedition. According to Henry W. Nichols, Associate Curator of Geology, who was a member of the expedition, the owner of the land at Joachim Alvarez had a wall built of roughly squared stone nearly a hundred years ago. Today there is a layer of aluminum ore more than three inches thick over the surface, and it is from this wall that the museum's specimen comes. The deposit was left by ground waters, drawn to the surface by capillary attraction through the pores of the soil during the dry season, says Mr. Nichols. These waters passed over the wall.

The region is one in which large deposits of aluminum ores are continuing to form at a rapid rate, Mr. Nichols states. The method of formation of these ores is somewhat complex, he says, but in a general way it may be explained that the alumina is dissolved from surrounding rocks and deposited as a thick crust of alternating beds of aluminum, iron and managanese ores by the ground waters.

Traces of nitrogenous organic matter which has remained in fossil skeletons of prehistoric animals for many millions of years have been revealed by chemical tests condutced at Field Museum by Henry W. Nichols, Associate Curator of Geology. Writing on this subject in the April issue of **Field Museum News,** the monthly bulletin published for the museum's thousands of members, Mr. Nichols says:

"Most people regard fossils as remains of animals or plants which have been converted entirely into stone. The fact is that fossils may and often do retain some of the organic matter of the living animal or plant. This may be detected by chemical means. For example, the great dinosaur skeleton from Fruita, Colorado, which is on exhibition in the museum, appears to be composed wholly of chalcedony. Nevertheless, a chemical test conducted during recent researches revealed the presence of nitrogenous organic matter which has remained with the skeleton during the 95,000,000 years since the animal died.

Two fossil eggs of nearly as great antiquity also appear to be wholly converted into chalcedony, but tests showed that they contain readily detected quantities of organic nitrogen. These eggs resemble duck eggs, but a long study failed to disclose exactly what kind of bird laid them. A fossil worm which lived about 40,000,000 years ago, recently collected in the Chicago region for the museum, has had so much of its original organic matter preserved that the fossil is composed of more than 95 per cent coal. This is interesting because coal is generally derived from vegetable instead of animal matter."

The formanifera, tiny marine animals of the Cretaceous period, about 100,000,000 years ago, some of them so small that they can be seen only with a microscope, are represented by a series of thirty enlarged models of as many distinct forms in an exhibit in the department of geology at the muesum. Many of the almost invisible shells, when magnified, are revealed to be in forms of great beauty, and potential units for use in design work. The bodies of these animals fossilized in masses make up the great European and American chalk deposits.

The fossil remains of a giant mollusk which in life, some 500,000,000 years ago, was about ten feet long, are on exhibition in Ernest R. Graham Hall of Historical Geology at the Museum. Nearby is a restoration, in the form of a large mural painting, showing how this creature of a long extinct species must have appeared when living.

The animal is known to paleontologists as "orthoceras", and is a member of the cephalopod family. The museum's specimen was found near Troy Grove, in LaSalle County, Illinois. The shell is long and straight, in contrast to those of most familiar modern mollusks. It is slightly conical or tapering, being composed of a series of chambers or segments, each slightly larger in diameter than its predecessor in the animal's growth. These were connected by an internal siphon or siphuncle. The animal lived in the last and largest chamber, vacating each chamber in turn as a new one was formed, according to Dr. Oliver C Farrington, Curator of Geology.

In the recently completed group representing a scene in a swamp forest of the Coal Age (some 250,000,000 years ago), which is one of the largest and most interesting exhibits at the Museum, restorations were made of two of the four-footed animals that appeared for the first time in the Carboniferous period. The evidence upon which these reconstructions have been made is summarized in an article in **Field Museum News,** monthly bulletin of the institution, by Dr. B. E. Dahlgren, Acting Curator of Botany, who designed the coal forest exhibit and supervised its preparation, as follows:

"The group to which these extinct amphibia belong is of importance not only as including the predecessors and ancestors of the very different present-day amphibia, but especially as forming the connecting link between the fishes of the preceding period and the reptiles of the next. To the distinction of being the first backboned animals to move on four legs and thus being the pioneers of vertebrate life on land, they add that of being the progenitors of the early reptiles and through them of the higher vertebrates.

A well-known impression in Devonian (a period 350,000,000 to 420,000,000 years ago) shale has been interpreted as a footprint and may indicate the existence of terrestrial vertebrates of an earlier time, but the earliest positive remains are of Lower Carboniferous age. These reamins are not abundant, but they have been found in various places in Europe as well as in North America. A coal mine in Ohio has yielded more than fifty different species.

The greater part of these specimens consists of fragments, a lesser part of incomplete skeletons. Usually these are so greatly flattened that they appear as mere impressions or silhouettes on the surface of rough slabs of cannel coal in which they are found. Many of these fossils are of small salamander-like animals; others are considerably larger and include elongated and eel-like forms. Few of the remains indicate animals exceeding a yard in length, but one of the long-tailed species may have reached a length of nine feet.

Fortunately some of these fossils are sufficiently complete to give a good idea of the skeletal structure, and a reconstruction of the skeleton of one of them was recently made in the American Museum of Natural History, New York, under the direction of Dr. William K. Gregory. It is based mainly on the remains of the Diplovertebron, a species discovered in Scotland. Field Museum acquired a duplicate of the skeletal reproduction, and on the basis of this was enabled to restore the external body form of the animal.

The second species of amphibian in the group is a small long-tailed species of Huxley's genus Coraterpeton. The restoration of this was made on the basis of data and drawings resulting from the studies of Prof. A. S. Romer, Vertebrate Paleontologist of the University of Chicago."

Recent "Finds" of Interest

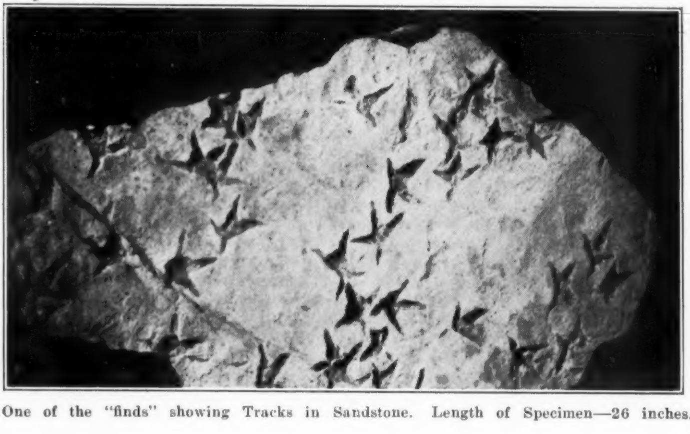
A REMARKABLE FOSSIL DISCOVERY

H. N. McConnell, of Boulder, Colorado, one of our warm friends and subscribers and a well-known collector of minerals in his city, recently made a "find" of some unusual fossil tracks of a Cretaceous bird. Mr. McConnell, accompanied by a friend, S. R. Taylor, was returning from an unsuccessful hunt for the zeolite locality near Golden, when the discovery of the tracks was made.

The discovery by Mr. McConnell is remarkable in that this is the first evidence of prehistoric bird life to be found in the region, and is also thought to be of a species not previously known. The bird has been named Ignotornis mcconnelli in honor of Mr. McConnell.

In commenting upon the discovery, Mr. Connell says, "This is not an outstanding fossil locality which probably accounts for the tracks not being found sooner. The tracks are found as natural casts on sandstone. A brick company mines clay from a small ridge known as the "Dakota hogback" and the specimens found were thrown out on the dump as worthless material and have been exposed for a number of years —within one mile of the State School of Mines—only to be found and collected by us."

The "hogback" lies between the lava-capped plateau of N. Table Mountain and the foothills of the Rockies, near Golden, Colorado.



One of the "finds" showing Tracks in Sandstone. Length of Specimen—26 inches.

Side View of Clay Pit which Runs for Hundreds of Yards. The Fossils come from this pit and were brought out through a tunnel and thrown on the dump. The pit faces the West Side of N. Table Mountain on the other side of which the Zeolites are found.

And Mr. McConnell concludes by saying, "Fossils are out of my line, and the only reason for calling attention to the find is as an example of watching for and reporting anything out of the ordinary that we may run across on our collecting trips. While I am very much pleased to be recognized I am well aware that the discovery was mostly an accident on my part and any printed note should carry nothing more than a brief statement of the facts for information only."

South end of the "Dakota Hogback," showing the Clay Pit running approximately North and South. The Hogback is approximately ¾ mile long.

The Collector's Workshop

ROCKS AND MINERALS would be pleased to have its readers contribute short notes from their experiences to this department.

THE STEREOSCOPIC PHOTOGRAPHY OF MINERALS

—— By ——

W. SCOTT LEWIS

2500 Beachwood Drive, Hollywood, California.

Ordinary photography gives us two-dimensional pictures in which protruding crystals and other irregularities seem to be pressed back onto a flat surface. Stereo-photography results in two flat pictures which seem to the casual observer to be identical, but which merge and appear to become three-dimensional when viewed through a stereoscope. In a properly prepared stereograph a person with normal vision, using a correctly adjusted glass, sees each crystal as a solid projecting into space, so he appears to be looking at an ordinary specimen. The result is a sense of reality which can not be obtained in any other way.

Stereoscopic photography has so many advantages over the ordinary kind that it would probably be almost universally adopted by mineralogists if many did not have an erroneous idea of the difficulties involved. As a matter of fact these are easily overcome and once the experimenter has obtained a good stereograph, which should be at the first attempt, he will never want to photograph a mineral specimen any other way.

The whole secret lies in taking two pictures which are slightly different, so the closer parts of the object are shown in a somewhat different relation to the more distant.

If one will hold a pencil at arm's length and look past it at the wall while shutting first one eye and then the other they will see it appear to jump back and forth. In other words it shows parallax in relation to the wall. In the same way if we photograph an object and then move the camera slightly to one side and photograph it again a careful study of the resulting prints will show that they differ by a very slight amount. A stereoscope enables us to see them superimposed upon each other and the brain translates the two slightly different visual sensations into a sense of solidity.

In the stereoscopic photography of landscapes it is customary to use a camera with two lenses set about 3.5 inches apart. For close-up work this distance is too great and one must either provide supplementary lens boards, so as to make it possible to vary the lens separation, or else use a single lens camera and take two separate pictures. I shall describe the latter method as it is not necessary to use a two-lens camera for motionless objects.

While it is possible to produce the stereoscopic effect with an ordinary kodak the best results require the use of a ground glass. An ordinary 4x5 plate camera with a long bellows is excellent. If one does not wish to bother with plates, which are bulky and fragile, the plate holders may be provided with film sheaths for use with cut films.

As the camera can not be screwed on the regular tripod top a board should be provided with a cleat nailed along the back, so the camera can be slid back and forth without any danger of being twisted slightly to one side. The main axis when taking picture No. 2 must be exactly parallel with its position when tak-

ing No. 1. The board may be screwed to the tripod top and need not be very long as the shift in position will usually be from one to three inches.

Let us suppose that we wish to photograph a group of crystals about four inches across. These will be arranged at the correct height on a table in front of a south window and turned slightly so the light will come a little from one side. Direct sunlight should not be allowed to fall on the specimen as it will lead to excessive contrast and greatly increase the danger of bad reflections from crystal faces.

Place the camera on the left side of the tripod board with the back pressed firmly against the cleat. Do not work so close that the image fills the entire ground glass. Focus carefully and remember that the sharpness will be greatly increased when the lens is stopped down. Now slide the camera slowly to the right, keeping the back against the cleat. Notice that the closer part of the image seems to slide past faster than the more distant part. Try moving the camera from one to two inches. It will probably be necessary to adjust the position of the specimen and perhaps move it farther away in order to get the image entirely on the ground glass in both positions. Having made all necessary adjustments between the two positions return the camera to the left of the board and carefully check the focus. Stop down to U. S. 32, or F 22, according to the markings on your camera. Lenses marked in the F system are better than others, but good work can be done with any lens if it is stopped down enough.

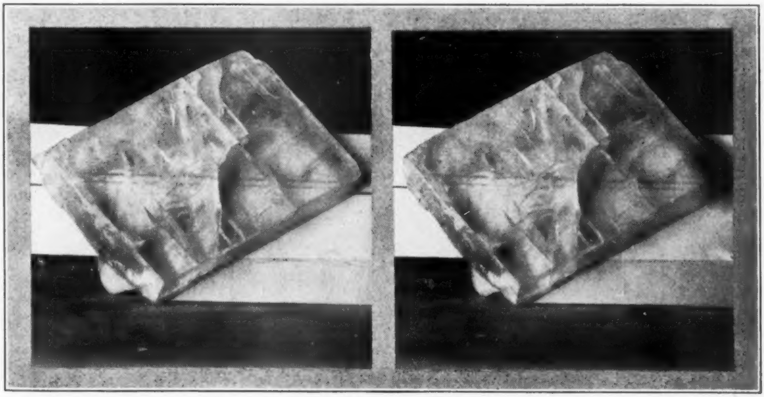
You are now ready to take the first picture. I recommend the use of a slow cut film. Personally I prefer commercial ortho, although panchromatic is sometimes better if one knows how to use it.

Some kind of a background is needed and a good one can be made by tacking a piece of cloth on a stick. This can be moved slowly back and forth behind the specimen during the exposure. A dark color is usually advisable. It will produce a smooth surface in the print because of the fact that it is out of focus and in motion.

The exposure will be a long one, the length depending upon the color of the specimen and the amount of light. It will probably vary from 30 to 60 seconds with the stop and film recommended above.

Having finished the first exposure slide the camera into the second position and repeat, being sure to give exactly the same time.

Both films must be developed together so they will have the same density. Use the developer with which you ordinarily work and carry the films to a good printing density. Beginners will find the Eastman Special Developer tubes very convenient and this developer is hard to beat for good results.



An Example of Stereoscopic Mounting.—The mineral shown is Iceland Spar which has the peculiar property of making a line appear double when it is laid upon it in a certain position.

When making prints from the two negatives be sure to give identical exposures and develop to equal density as an unpleasant effect is produced if one print is darker than the other. Personally I use Azo paper, grade E. Contrasty negatives can be printed on No. 2 and those lacking in contrast on No. 4.

The standard stereo mount measures 3.5x7 inches. They are carried in stock by the larger photograph stores, but if anyone finds it impossible to obtain a supply I will help them in the matter if they will write me, enclosing a stamp for reply.

I have devised a simple method of preparing prints for mounting that I consider superior to any given in the textbooks. Hold one of the dry prints close to a 100-watt light and slide the other over it until the outlines of the most distant parts of the specimen (or some other parts that are plainly visible through the two prints) are seen to be exactly superimposed upon each other. Other parts of the two prints will not appear to all match simultaneously because of the parallax. Now hold the two prints tightly together and trim them to a size that will fit nicely on the stereo mount.

Prints should be mounted dry with a good paste to prevent curling. Before mounting they should be flattened and laid side by side on a mount that has been placed on the edge of a table. Remove the print holder from a stereoscope and slide the bar down past the prints until they are seen in proper focus. If they are in the correct relation to each other the parts of the specimen that were closest to the camera will stand out properly. If their position is reversed these parts will appear to retreat behind the back of the specimen, producing a very peculiar effect. The remedy is to reverse the prints.

If the prints have been trimmed as suggested above there will be no difficulty in mounting them side by side so they will unite properly.

A little experimenting will soon show one just how to do this. The most important rule to remember is that the line connecting identical points must always be parallel to the bottom of the mount. In correctly trimmed prints this will be the case if the bottoms are mounted at an equal distance from the bottom of the mount and parallel to it.

In closing I wish to urge the experimenter to go one step further and learn to tint his prints with water colors. When carefully done this adds greatly to the naturalness of the result. The only things to remember are that both prints must be colored exactly alike and that errors due to careless handling of the brush will be magnified by the stereoscope. When a little skill has been acquired it is possible to prepare pictures of great beauty, even when the original specimen was quite small.

The first Annual Outing of the Rocks and Minerals Association will be held Sunday, June 26, at the Forest of Dean Magnetite mine near Fort Montgomery, N. Y. Members from four states (New York, New Jersey, Connecticut and Massachusetts) have already signified their intentions of being present, so indications are the Outing will be a grand success.

Though the Forest of Dean mine is an old and historic mine—176 years old and still in operation—it is not very well known to collectors but the following minerals are listed as occurring there by Manchester[1]: amphibole, anhydrite, apatite, **boltonite** (forsterite), calcite (pink), **coccolite,** epidote, gypsum, magnetite, oligoclase, **pargasite,** pyroxene, quartz **sahlite** scapolite, spinel, wernerite, and zircon.

Fred W. Schmeltz, 2510 Maclay Ave., New York, N. Y., is in charge of the Outing and interested members are urged to get in touch with him at their earliest and be registered. (All subscribers to Rocks and Minerals are Members of the Association.)

Those having cars would be conferring a favor upon Mr. Schmeltz were they to advise him if room for one or more extra persons was available so as to accommodate members not having cars.

See page 73 (this issue) for regular announcement.

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[1]—Manchester, J. G.—The Minerals of New York City and Its Environs.

Interesting Localities and How to Reach Them

LAPIS-LAZULI IN CALIFORNIA

By

FRED W. SCHMELTZ
2510 Maclay Ave., New York, N. Y.

There is only one place where lapis-lazuli is known to occur in the United States, a locality near the summit of Ontario Peak in the San Gabriel Mountains of Southern California. The stone found here is not of suitable quality for any commercial or artistic use as it is of too light a blue color. In the orient a deep blue material is obtained which is carved into valuable vases, statuary, etc.

The locality can be reached from the city of Upland by going north on Mountain Avenue about 7 or 8 miles from where it intersects the Foothill Boulevard. At this distance, which is well within the San Antonio Canyon, there is a small bridge and side road to the right; the main highway continuing on to Camp Baldy. This side road dead ends but a good trail continues on up the mountain side, though it gradually becomes narrower and more difficult to follow. About 5 miles up there is a prospect hole 10 feet deep with ladder and windlass, which was sunk in what was thought to be a silver deposit. It is in the waste rock from this prospect that the lapis-lazuli is found. It occurs in parallel veins an inch or less in thickness, and can be observed in the side walls of the prospect.

Near this prospect and also on the trail about one mile from the beginning are outcrops and huge boulders of syenite with plentiful crystals of corundum The crystals are small, averaging about $\frac{1}{8}$x$\frac{1}{2}$ inch, of blue color and are evenly distributed throughout the rock.

Close-up View of Prospect Hole, showing Windlass. Ontario Peak, Calif.

The Amateur Lapidary

Conducted by

J. H. HOWARD*

504 Crescent Ave., Greenville, S. C.

Amateur and professional lapidaries are cordially invited to submit contributions and so make this department of interest to all.

*Author of—*The Working of Semi-Precious Stones.* A practical guide-book written in untechnical language for those who desire to cut and polish semi-precious stones.

HELPFUL HINTS

—— *By* ——

H. E. BRIGGS, Lapidary

Columbia Falls, Montana.

It is remarkable that every amateur lapidary of today is not hopelessly confused by all the advice given him. Every man seems to have a pet way of doing each thing and appears to figure that his way is the only real way. It appears to be more convenient for some of us to go a long way around, and often the long way proves the shortest for that particular man. But the widely varying methods suggested and recommended simply means that there are many ways to a fixed objective and that each man should choose the way that seems best suited to him.

I have been a professional lapidary for years and have cut every kind of gem worth mentioning as such. While it is entirely feasible for the amateur to cut cabochons successfully, I sincerely believe that it is foolish for him to try to cut faceted gems unless he has proper equipment and a thorough knowledge of cutting and polishing both curved and plane surfaces. He should also have considerable knowledge of optics as applied to crystals if he expects to produce anything really worthwhile. The amateur should confine his efforts to slabs and cabochons until he has really mastered that phase of gem cutting before he attemps to produce faceted stones. In his spare time he should prepare himself for the faceting ordeal by studying optics, putting especial stress on refraction, reflection and dispersion.

The cutting of flat surfaces will certainly trouble the amateur more than will the curved ones. In either case, however, the real secret of success is the skilled touch and dexterous handling of the stone. If the pressure on the stone being cut is not applied centrally the stone will be cut more on one side than on the other. Then if the stone is turned around and the same touch is maintained, an angle will be cut on the stone and the work will have to be started over again. The same thing is true of the curved surface of a Cabochon. Unless the proper touch and dexterity is exerted, angles will be formed and the stone will not be symmetrical. There are many different kinds of devices designed to hold stones mechanically, but I have yet to see a machine that would take the place of the skilled hand and the trained eye. Having acquired the skill that comes with practice, a good workman will have no trouble whatever in doing a perfect job on the ordinary layout of abrasive wheels, and wood and felt laps.

The system I use on cabochons varies somewhat with the material I am working on. On opal, obsidian and other materials of 5 to 6.5 hardness, I cut first on a 100 grit carborundum wheel. The second cutting is on a wood lap charged with soap water and 150 carborundum grains. The third operation is on a wood wheel charged with pumice, soap water and a little whiting. The pol-

ishing is done with tin oxide on either a wool felt or a buckskin faced lap or with a special compound which I prepare. A fairly high polish will be had with the tin oxide, but it can be very much improved with a buckskin lap charged with soft rouge mixed with soap water. The only advantage of the patent compound over these two polishes is that it does as good a job in a single operation.

For material harder than 6.5, it will save time to make a second rough cut on a 150 grit abrasive wheel before making the first paste cut.

For material softer than 5 proceed as with opal, etc., except omit the first carborundum paste cut.

For very soft material, do the rough cutting with the 150 grit wheel. Then go direct to the tin oxide operation, then the buckskin lap with rouge. It is sometimes better to omit the tin oxide operation, going directly from the rough grind to the rouge. To get a high polish on these soft stones, finish them on a cotton flannel lap charged with stearic acid or soap water and prepared talc or with oil and talc.

It will be found a material help to turn into the wood wheels rounded grooves which will make it somewhat more convenient to cut the rounded surfaces, however, it should be borne in mind that unless you have plenty of wood laps that these same grooves will prove a real disadvantage when it comes to flat slabs of good size.

I find that the felt laps and leather faced laps are better without the grooves and it makes them suitable for doing slabs.

Now just a few words on slabs in particular. The operations are about the same as for Cabochons, however, it will be found that after some skill has been attained in cutting and polishing, a set of cylinders instead of laps will be more satisfactory for the making of slabs.

Again with the change from lap to cylinder you will find that you are called on for a new dexterous movement since the stone must be moved at an even speed and pressure over the cylinder otherwise a wavy surface will be produced. Another point in working on a cylinder that should be taken into consideration is the fact that continued working on a slab in one direction will tend to produce waves even in the hands of one that is skilled. Hence the work should be alternated so that the cuts cross each other. With the exception of these points the cylinder working of slabs will be found much the same as working on laps, and it will be found that a more even surface and polish can be obtained.

FLATTING OF WHEELS

—*By*—

J. H. HOWARD

The advice of most cutters is to use a speed of 900 to 1800 r. p. m. on carborundum wheels of 6 inch diameter for cutting stones. The writer first used 900 r. p. m., then changed to 1800 r. p. m. and got much better results. But it seemed that the wheels developed flats faster than should have been expected. The wheels used were 100-J-G5. A letter to the manufacturer drew the following interesting reply:

> "The cause of wheels getting out of round is usually due to one of two factors. Either the wheel operates at too slow a speed or is too soft in grade. Carborundum brand vitrified wheels are recommended to operate at speeds of 5000 s. f. p. m. and up, whereas your speed of 1800 r. p. m. for a 6 inch diameter wheel is less than 3000 s. f. p. m. A larger diameter wheel at the same r. p. m. will increase the surface speed and the tendency will be to have the effect of the harder grade wheel. We can also supply wheels in "K" grade which is one grade harder for the same speed without effecting the cutting speed very much. Either change should cause the wheel to stay round for a longer period."

We have not yet tried out the higher speed but expect to do so. We are passing this dope on to you so that you may be doing your own experimenting in the meanwhile. You will have to watch your water supply, as doubling or quadrupling your present speed will greatly effect the behavior of the water. It is believed, however, that the sponge feed will work perfectly on this higher speed. It will be well also to watch the motor, as it may possibly be seriously overloaded at this new speed.

Ideas and Suggestions

SENT IN BY READERS

Dr. Henry C. Dake of Portland, Oregon, presents a plan for introducing the study of mineralogy and the collecting of minerals in schools. He says, "I have received a large number of requests from the public schools of this city to lecture to the children on rocks and minerals. This week I went to one of the large schools and they packed over a hundred children in the room to hear the talk and see the specimens. I generally take along a few dozen specimens to illustrate the talk and pass them around. The children show such a keen interest in the lecture, that it is a pleasure to talk to them.

It would be a great boon for mineralogy if collectors in various cities and towns were to volunteer to talk on minerals before the children of the public schools and assist teachers in labeling, classifying and displaying specimens. The schools and teachers would gratefully appreciate this as they are always happy to get help along this line.

I did not get started in this work until late in the school year but by next fall I hope to make arrangements to go at it in a more systematic way, giving a lecture once a week and making it a point to visit every school at least once a year.

I have a lot of youngsters started now in collecting and feel sure many more will fall in line before long.

If we could get a few dozen volunteers working on this idea, mineral collectors would soon spring up all over the country and mineralogy would come into its own."

Heber H. Clewett, Superintendent of the Voorhis School for Boys at San Dimas, Calif., sends in an idea which is worth passing on to our readers and especially to mineralogical clubs. He says, "With the idea of stimulating interest in minerals and mineral collecting in this community, the Voorhis Prospectors' Club is sponsoring a mineral collection contest in the San Dimas Grammar School. A prize of two VPS 28-compartment trays of labeled mineral specimens, contributed by members of the Voorhis Prospectors' Club, is being offered. The best three collections in the exhibit at the end of the school year will be chosen, and their owner given opportunity to compete in a short mineral-identification test, the winner to receive the prize. The mineral collections will be judged for quality, arrangement, correct identification, labeling and general excellence by three judges consisting of the principal of the grammar school, the president of the Voorhis Prospectors' Club, and the faculty member of that club (your humble servant). All minerals exhibited must belong to the boy or girl who displays them. No member of the Voorhis School will be eligible to take part in the contest, of course. Active work in preparation for this contest has already begun, both in the Prospectors' Club and in the San Dimas Grammar School."

Marshall M. Algor of 120 Willow St., Fair Haven, N. J., a 13 year old collector, sends in a kink which may be of some interest to junior collectors. Young Marshall mounts many of his specimens on small 8-sided bathroom tiles and the result is very pleasing. The tiles can be obtained in black and in white colors and the mounting material must be a good grade of wax. When mounting, both tile and specimen should be quite warm. Here is his method which was taught him by his uncle, a dentist.

"I melt ordinary paraffine or a good

wax candle and with a small metal spoon (such as is used by dentists) I place a drop of hot wax on the tile, this I rub in thoroughly. Then I dip the end of the specimen in the hot wax. Next I place the specimen on the tile and pour more hot wax around the base of the mineral. After this has cooled, I take the other end of the spoon (which is a sort of spatula), heat it thoroughly, and then smooth off the surplus wax. In this way the specimen and tile seem more thoroughly welded.

If a specimen is just stuck in a drop of hot wax placed on the tile, it will fall off when inverted."

Marshall now has over 1,000 specimens in his collection and has the distinction of being the youngest member of the Newark Mineral Club.

In breaking open geodes, I have found a sand box to be a very useful article. After placing a quantity of sand in a box of suitable size, moisten it. Place the geode on the sand, pushing it in a little, and revolve it, hitting sharp blows with a mineral hammer. When a complete circuit has been made, give the geode a very hard blow and it will break neatly along the tapped line.

CLYDE D. ALLAN,
Waterloo, Iowa

First Annual Outing

--- of the ---

Rocks and Minerals Association

Date—Sunday June 26, 1932.

Destination—Forest of Dean Magnetic Iron Mine near Fort Montgomery, Orange County, N. Y. (Five miles west of Bear Mountain Bridge.)

Time—11:00 A. M.—5:00 P. M. (approximately) Daylight Savings Time.
(Please bring lunch)

The Forest of Dean mine is not very well known among collectors though it is an old and historic mine—176 years old—and still in operation. Its main shaft is over **one mile in depth** (on the incline). A number of large dumps will be at our disposal and it is hoped many interesting specimens (some perhaps never recorded from here) may be found. A list of specimens found will be printed in the September issue of "Rocks and Minerals."

Charges—A toll charge of 80c per car plus 10c for each rider (one way only) is levied against those using the Bear Mt. Bridge and these charges should be apportioned equally among the members participating in the outing.

For further particulars, including registration, apply to

FRED W. SCHMELTZ, Director of Outing,
2510 Maclay Ave., New York, N. Y.

Members are cordially invited to bring friends to the outing.

Our Junior Collectors

Some Day They May Be Our Leading Mineralogists

MARJORIE WILLIAMSON

Marjorie Williamson

One of our youngest subscribers and members, and an active mineral collector, is Marjorie Williamson, a little Miss of ten summers or winters, who lives in the livestock country of Eastern Oregon at Richland, Baker County, in the summer and at La Grande, Union county, in the winter. Marjorie is in the 6th grade at school and one of the brightest little girls in her class. She is a warm friend of Rocks and Minerals and has shown her interest in many ways, one of which was in inducing a friend to subscribe.

The spring after she became 9 years old, Marjorie started to show much interest in the flowers blooming around the ranch house and gathered and preserved as many of the different varieties as she could find.

But it was minerals in which she soon began to show an unusual interest and to shower all her attention on and she was encouraged by her parents. Her father, as is common with Westerners, knows considerably about minerals and takes her on many a trip for the purpose of collecting specimens and she never tires of going "Rock hunting".

Marjorie has a large number of friends among cowboys, miners and prospectors and they have presented her with many fine specimens; some of our readers who take great joy in encouraging youngsters to collect minerals have likewise presented her with nice specimens (William C. McKinley of Peoria, Ill., sent 40) so that she now has over 200 specimens in her collection.

Baker County is rich in minerals and the Lookout Mountain district especially so. Lookout Mountain has an elevation of 7200 feet and less than 10 miles away from Richland, Snake River winds down its canyon at an elevation of almost 2000 feet. Marjorie can ride her pony to the brow of a ridge and look down into this mighty chasm of Snake River; and during the present summer she hopes to take a trip through the canyon and if she does she may perhaps write us a little article about her experience.

For those who may like to write Marjorie, address her in care of her father, J. R. Williamson, Richland, Oregon.

DOROTHY J. AND THOMAS T. RODGERS

Dorothy J. Rodgers

Milwaukee, Wisc., is a large city and known the world over, but to readers of ROCKS AND MINERALS the two most interesting people living there are Dorothy J. Rodgers, ten years old, and her brother, Thomas J., nine years old. For these two youngsters are keenly interested in minerals and vie with one another in collecting them. Should Thomas add a few nice specimens to his collection, Dorothy immediately plans to acquire a duplicate set for her collection, and vice versa.

Thomas hopes to go on a trip to the Black Hills of South Dakota this summer and if he does we are very sure a large number of interesting mineral and fossil specimens will be collected and equally divided—one for him and one for his sister.

Thomas and Dorothy are warm friends of ROCKS AND MINERALS and read each issue from cover to cover. They reside at 1227 N. 30th St., Milwaukee, Wisc.

Thomas T. Rodgers

MINERAL LOCALITIES INFORMATION DEPARTMENT

Members desiring information regarding minerals or mineral localities in the following states may obtain it by writing to the Collectors listed and enclosing a self-addressed stamped envelope.

Oregon, Southern Idaho, Northern Nevada	Dr. Henry C. Dake, 793½ Thurman Street, Portland, Ore.
The Oregon Coast, South and Western Oregon, Northern California, Southern Washington	John M. Tracy, 601 Orange Street, Portland, Ore.
Petrological Information in Central Eastern Iowa	Prof. Wm. J. H. Knappe, Curator, Wartburg College Museum, Clinton, Iowa.
Massachusetts	Edward C. Foster, 1 Kingsley Ave., Haydenville, Mass.
Pacific Southwest, especially Southern and Central California	Edwin V. Van Amringe, Department of Geology, Pasadena Junior College. Pasadena, Calif.
Western Connecticut	Wilbur J. Elwell, R. F. D. No. 4, Box 18, Danbury, Conn.

Bibliographical Notes

The Gems of Isle Royale, Michigan:— By Fred Dustin. (Reprinted from Papers of the Michigan Academy of Science, Arts and Letters, Vol. XVI, 1931. Published 1932). Pages 383-398.

For several weeks during the summers of 1923 and 1930, Mr. Dustin was making a survey of the archaeology of Isle Royale for the University of Michigan. The work took him almost completely around the shores of the island which is approximately 45 miles long and into much of the interior. Part of nearly every Sunday was devoted to a search for gems and this little pamphlet describes in an interesting way many of the fine specimens found and collected by Mr. Dustin.

The Directory of Quarries, Clayworks, Sand and Gravel Pits, etc., for 1931: A valuable directory of the quarrying, sand, clay and gravel industries of Great Britain. Fourth Edition, 264 pages, 1 colored geological map. Published by The Quarry Managers' Journal, 53 Broad St., Birmingham, England. Price 6 shillings, net.

Review of the Natural Gas and Petroleum Development in New York State:— By D. H. Newland, State Geologist and C. A. Hartnagel, Assistant State Geologist, New York State Museum, Albany, N. Y. (From New York State Museum Bulletin 295, pages 101-184).

The review is in the nature of an answer to the numerous inquiries received for information by bringing together in small compass the results of study and experience in the New York areas.

THE ROCKS AND MINERALS ASSOCIATION

PEEKSKILL, N. Y., U. S. A.

Organized to stimulate public interest in geology and mineralogy and to endeavor to have courses in these subjects introduced in the curricula of the public school systems; to revive a general interest in minerals and mineral collecting; to instruct beginners as to how a collection can be made and cared for; to keep an accurate and permanent record of all mineral localities and minerals found there and to print same for distribution; to encourage the search for new minerals that have not as yet been discovered; and to endeavor to secure the practical conservation of mineral localities and unusual rock formations.

President's Page

(DR. H. C. DAKE, President. Rocks and Minerals Association.)

THE FUTURE OF MINERALOGY

For the past two years, during which time the writer has served in office, it has been a pleasure to observe a healthy growth in the membership of our Association, as well as a revival in the study and collection of minerals. Many new collectors have entered the field as well as a substantial number of the younger generation. Through the efforts of some of our members, the study of minerals has been introduced into the curriculums of a number of schools in different parts of the country. These members have also helped the schools start mineral collections by their donations of many specimens. Public displays of minerals made by many of our members, in libraries, schools and in public buildings, have also done much to interest the general public in minerals.

A large number of persons who follow prospecting either as a vocation or avocation have become members of our Association, during the past two years, and many of these new members have taken up the study and collecting of minerals with gratifying results to themselves. Access to a mineral collection is often of considerable help to prospectors, as a good representative collection can be invaluable for comparative and study purposes. Many cases are on record where prospectors have overlooked and passed by a valuable mineral deposit for the sole reason that they were not familiar with minerals. Probably the most notable example of this kind, is the case of the two prospectors who camped by an outcroping of a black looking mineral, which in spite of their efforts refused to "pan" any gold, so they gave up in despair and moved on. This same outcroping finally developed into the famous Comstock Lode mine, producing many millions in silver. Even an elementary student of mineralogy would hardly make a blunder of this kind.

With the metal industries of our modern civilization using metals which were little known in the past, and searching for new deposits of these, it behooves the prospectors to become familiar with a more diversified number of minerals. The day of the old time prospector searching solely for gold is past. The present day prospector is learning to recognize and test in the field, the ores of a large number of metals, which are in commercial demand and often more valuable than a "gold mine". Furthermore, a number of prospectors, who spend a great deal of time in the field, have through study and observation found what collectors want and collect mineralogical and geological material wherever the opportunity presents itself, in this manner often earning the "grub stake" funds.

During the past thirty years the world has mined and consumed more of its mineral resources than the total for all preceding history. Many of the noted mining areas are becoming exhausted, necessitating a search for new deposits or developing some of the present known but unworked areas. If the present rate of mineral consumption continues to increase as it has during the past few years, the future demands will be tremendous.

As the new mineral deposits are being prospected and opened for exploitation, the collector will no doubt find much new material available, while specimens from the older mining localities will be on the decline. It is the opinion of the writer that in the near future much cabinet specimen material, comparable to that of the past, will be available. Many of the fine well-crystallized specimens seen in the older collections, were obtained from the early workings of our well-known mines. When depth is reached and the zone of oxidation is passed, most mines then yield mainly massive material.

With all this in mind, it is obvious that the near future holds much in store for the younger generation of mineral collectors. With the increasing needs of the world for new mineral deposits more and more attention will be turned to prospecting, mining, mineralogical study and mineral collecting.

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Club and Society Notes

NEW YORK ACADEMY OF SCIENCES

At the meeting of the New York Academy of Sciences on February 2nd, Dr. Anderson of the United States Steel Corporation gave a talk on pegmatites. He explained his theory of the manner of formation of pegmatites in regions where folding has taken place, and illustrated the talk with slides. Many excellent pictures of European occurrences of pegmatite served to illustrate the salient features of the lecture.

On Monday, March 7th, Prof. Paul MacClintock of Princeton University gave a discussion of the glaciation of England, illustrated by lantern slides. Prof. MacClintock explained the difficulties of correlating the glacial deposits in various parts of England and also discussed some of the artifacts which have been found.

Monday, April 4th, was given over to a symposium on some of the geological work done by the Board of Water Supply of New York City. Dr. Horace Blank (Assistant Geologist of the Board of Water Supply) gave a description of City Tunnel No. 2, now almost completed. He described the rock formations encountered in this tunnel and some of the difficulties of construction. Mr. Girard Wheeler, who is preparing a thesis for Columbia University, explained in detail the geologic situation encountered in this tunnel under Riker's Island, and the complicated structure found there. Mr. Thomas W. Fluhr (Assistant Geologist of the Board of Water Supply) gave a discussion of the geology of part of the Harlem and Tarrytown Quadrangles through which will pass the proposed Kensico-Hillview Tunnel, and the geology of part of the Carmel and Stamford Quadrangles, through which will pass the proposed West Branch-Kensico Tunnel. Prof. C. P. Berkey (Consulting Geologist of the Board of Water Supply) then added some comments on the geological work which has been done in the effort to supply New York City with water. The discussions were illustrated by lantern slides.

NEW YORK MINERALOGICAL CLUB

At the meeting of the New York Mineralogical Club of February 17th, Dr. Waldemar T. Schaller of the U. S. Geological Survey, who had been in New York attending the meetings of the American Institute of Mining and Metalurgical Engineers, gave a lecture entitled "Some Fascinations of Mineralogy". Dr. Schaller's talk was as interesting as it always is, and evoked much discussion and many questions from members of the Club. Dr. Schaller took advantage of the opportunity to reiterate his theories of mineral replacement in rocks, showing many slides made from photomicrographs of rocks illustrating the relations between quartz, the feldspars, and other minerals. He also discussed the crystal casts found in the trap rock of New Jersey and their mode of formation.

In addition to the above lecture, Dr. Schaller has been giving a series of talks during the week at Columbia University.

On Wednesday, March 16th, Dr. J. F. Schairer of the Geophysical Laboratory, Carnegie Institution, gave a discussion of the synthesis of rock minerals, illustrating his talk with lantern slides. Dr. Schairer explained the attempts which have been made to solve the problems involved in the crystallization of rocks from their magmas, and the manner in which these problems have been approached from a laboratory standpoint with the aid of physical chemistry.

On Wednesday, April 20th, Dr. A. C. Hartnagel, (Assistant State Geologist of New York), gave a talk on the minerals and mineral industries in New York State. The talk was illustrated by lantern slides.

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PROFESSIONAL DIRECTORY--Continued

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Of Rocks and Minerals published Quarterly at Peekskill, N. Y., for April 1, 1932.

STATE OF NEW YORK,
COUNTY OF WESTCHESTER } ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Peter Zodac, who, having been duly sworn according to law, deposes and say that he is the Editor and Publisher of the Rocks and Minerals and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Name of	*Post Office address*—
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2. That the owners are: Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.) Peter Zodac, Peekskill, N. Y.

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PETER ZODAC, Publisher.

Sworn to and subscribed before me this 1st day of April, 1932.

MAUD L. BARRETT,
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My commission expires March 30, 1934.

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